PROJECT WORK

GREEN CHEMISTRY

SUBMITTED TO

DEPARTMNENT OF CHEMISTRY

SVCR GOVT. DEGREE COLLEGE

PALAMANER.

SUBMITTED BY

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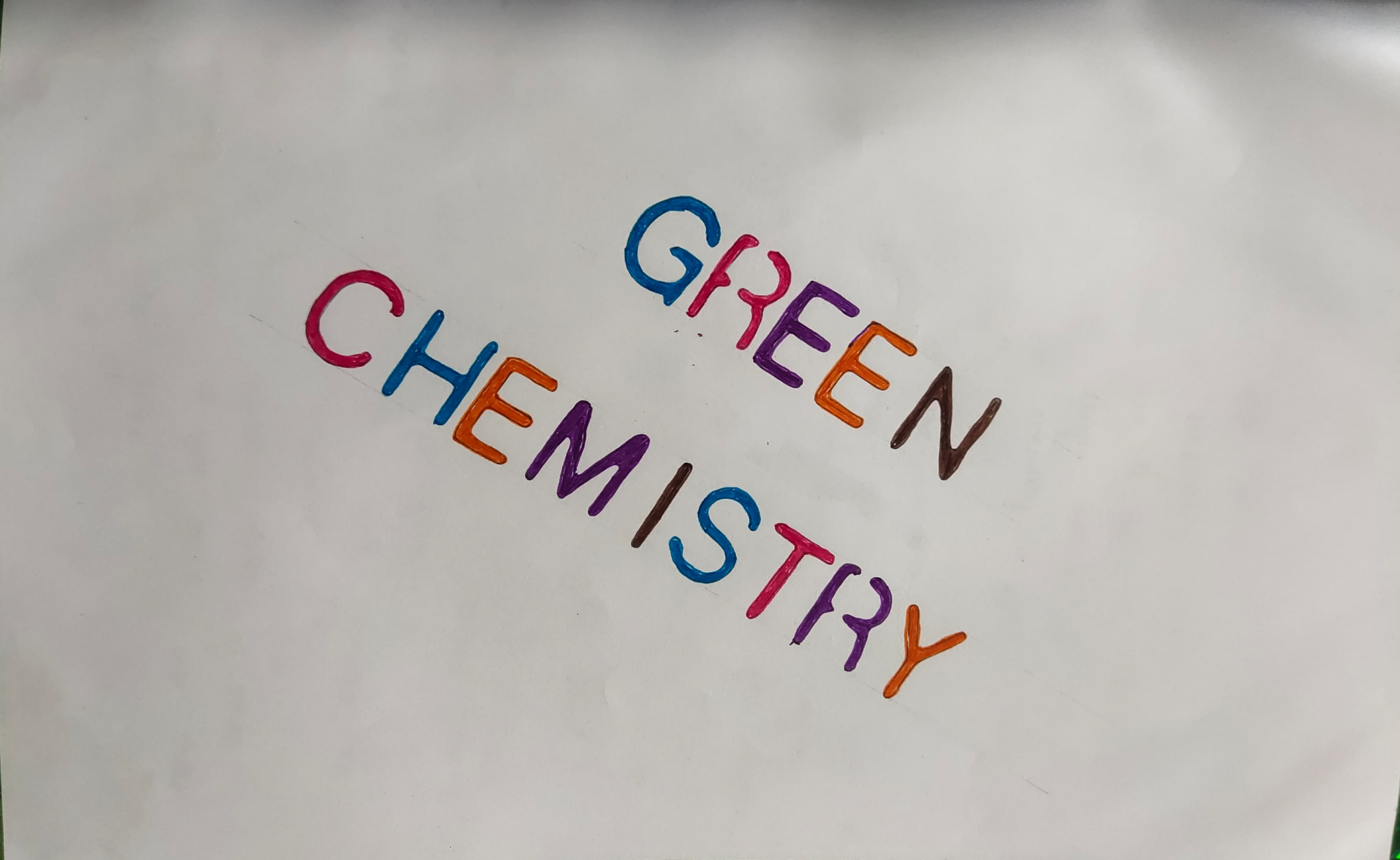
February-2019

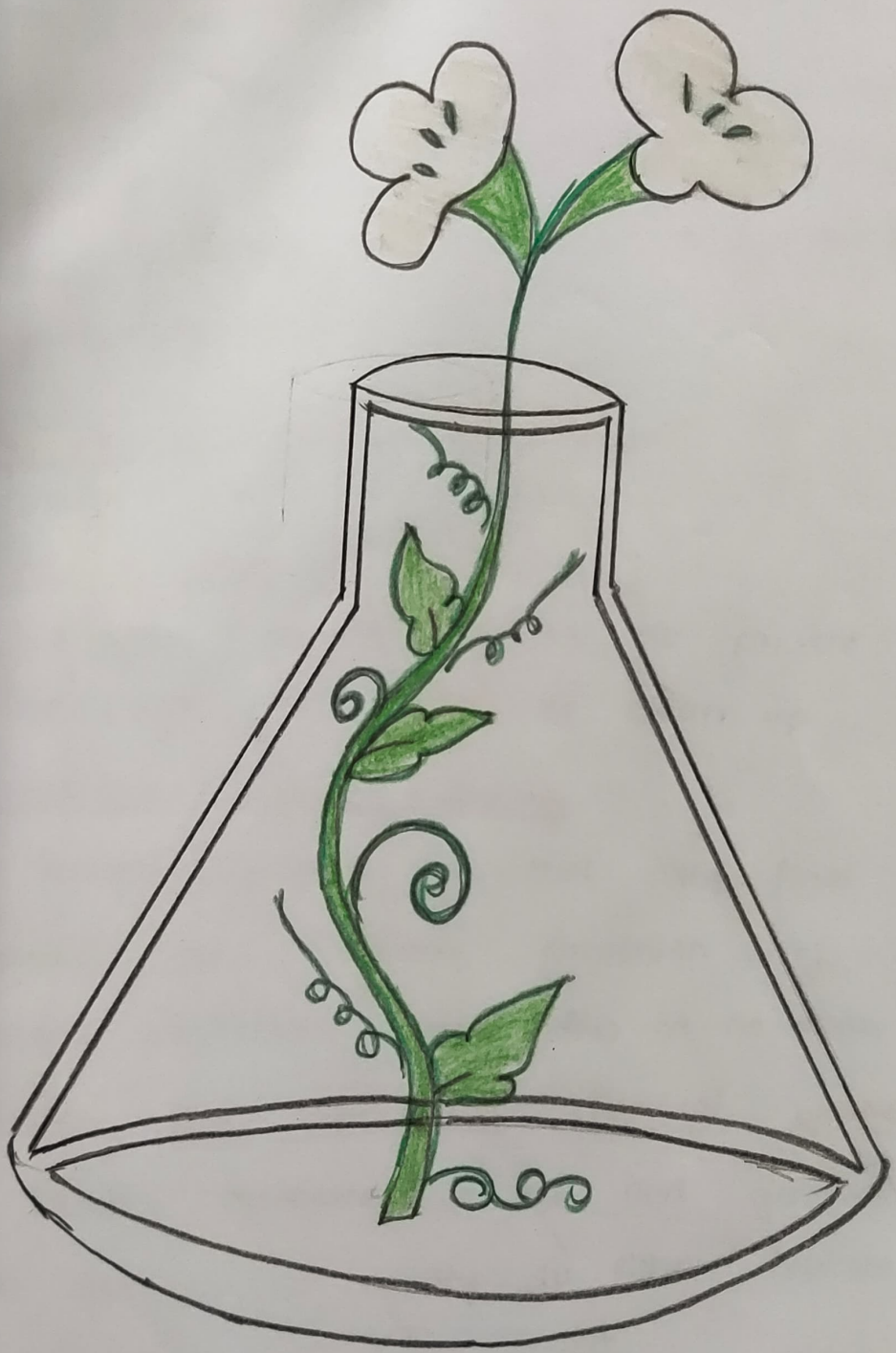
PROJECT WORK


GREEN
CHEMISTRY

Definition of Green chemistry:

Green chemistry is the design of chemical products and process that reduce or eliminate use or generation of hazardous substance. Green chemistry applies across the life cycle of a chemical product ; including it's design, manufacture use and ultimate disposal. Green chemistry is also known as "sustainable chemistry."

- prevents pollution at the molecular level.
- It is a philosophy that applies to all areas of chemistry, not a single discipline of chemistry.
- Applies innovative scientific solutions to real-world environmental problems.
- Results in source reduction because it prevents and processes on human health and environment.
- Lessens and sometimes eliminates hazard from existing products and processes.
- Desings chemical products and processes to reduce these intrinsic hazards.
- Avoid using solvents, seperation agents or other auxilliary chemicals. If you must use these chemicals use safer ones.



The purpose of green chemistry

The purpose of green chemistry is to discover new ways to make the best chemical products and processes that need less reagents, smaller amounts of slovent and fewer energy to make, also being safer, producing less waste, and increasing productivity.

Principles of green chemistry.

There are 12 principles.

1. **Prevent waste**

Design chemical synthese to prevent waste. Leave no waste to treat or clean up.

2. **Maximize Atom Economy.**

Design syntheses so that the final product contains the maximum proportion of the starting materials. Waste few or no atoms.

3. **Design less Hazardous chemical synthesis**

Design syntheses to use and generate substances with little or no toxicity to either humans or the environments.

4. **Design safer chemicals and products:**

Request chemical manufactures to design safe chemicals.

5. Use safer solvent and Reaction conditions

Avoid using solvents, seperation agents, or other auxilliary chemicals, if you must use these chemicals use safer ones.

6. Increase Energy Efficiency

Run chemical reactions at room temperature and pressure whenever possible.

7. Use Renewable Energy

use starting material that are renewable rather than depletable. The source of renewable feedstoocks in often agricultural products or the wastes of other processes, the sources of depletable feed stocks is often fossil fuels or mining operations

8. Avoid chemical Derivatives:

Avoid using blocking or protecting groups or any temporary modifications if possible, Derivatives use additional reagents and generate waste.

9. Use catalysts instead of stoichiometric Reagents

Minimize waste by using catalytic reactions catalysts are effeive in small amounts and can carry out a single stoichiometric reagents which are using in excess and carry out a reaction only once.

10. Design chemicals and products to Degards After use.

Design chemical products to break down to innocuous substances after use so that they do not accumulate in the environment.

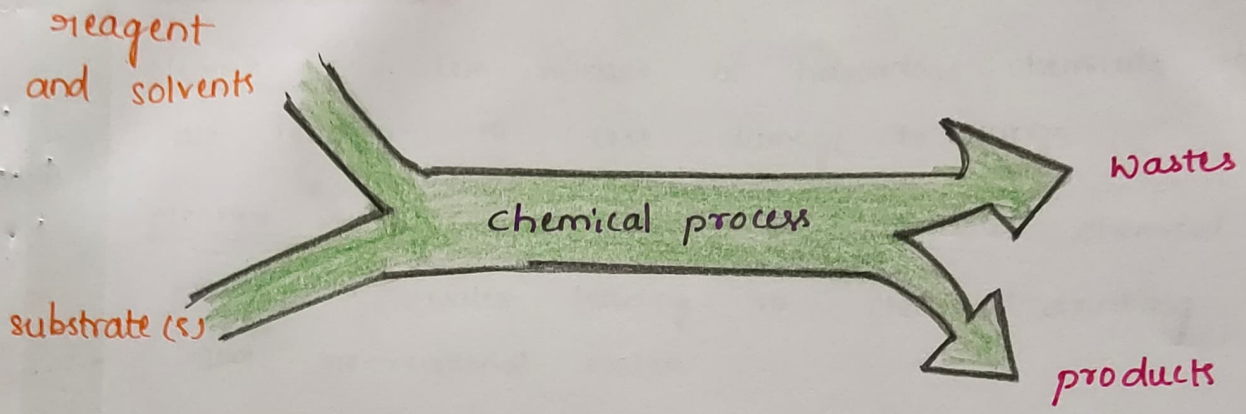
Analyze in Real time to prevent pollution:

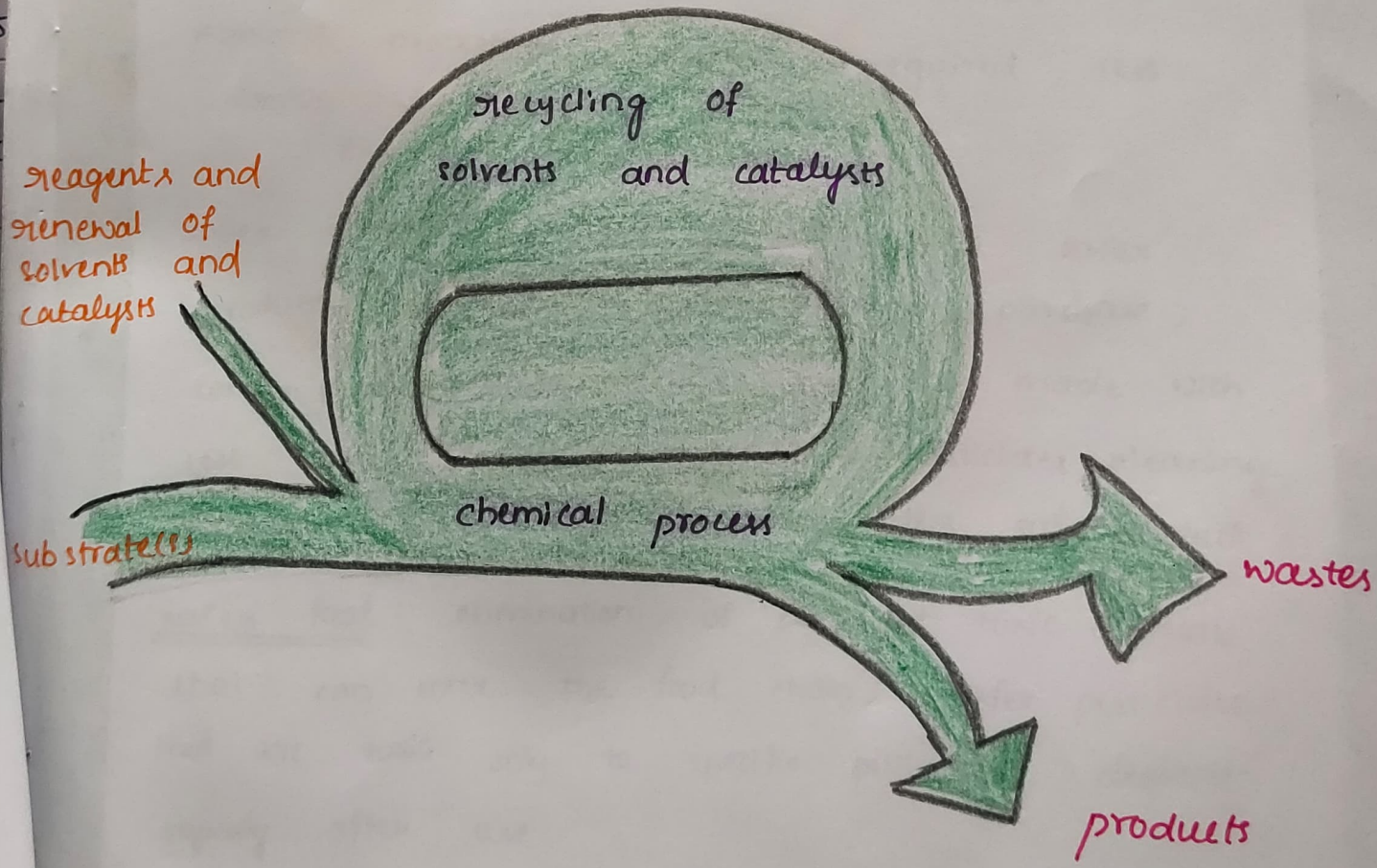
include in process, real-time monitoring and control during synthesis to minimize or eliminate the formation of by products.

Minimize the potential for Accidents

Design chemicals and their physical to minimize the potential for chemical accidents including explosions, fires and releases to the environments.

A typical chemical process generates products and waste from raw material such as substrate, solvents and reagents. If most of the reagents and the solvents can be recycled, the mass flow looks quite different.


reagent and solvents
substrate (s)
chemical process
wastes
products


recycling of solvents and catalysts
reagents and renewal of solvents and catalysts
substrate(s)
chemical process
wastes
products

BENEFITS OF GREEN CHEMISTRY

HUMAN HEALTH:

cleaner air : Less release of hazardous chemicals to air leading to less damage to lungs.

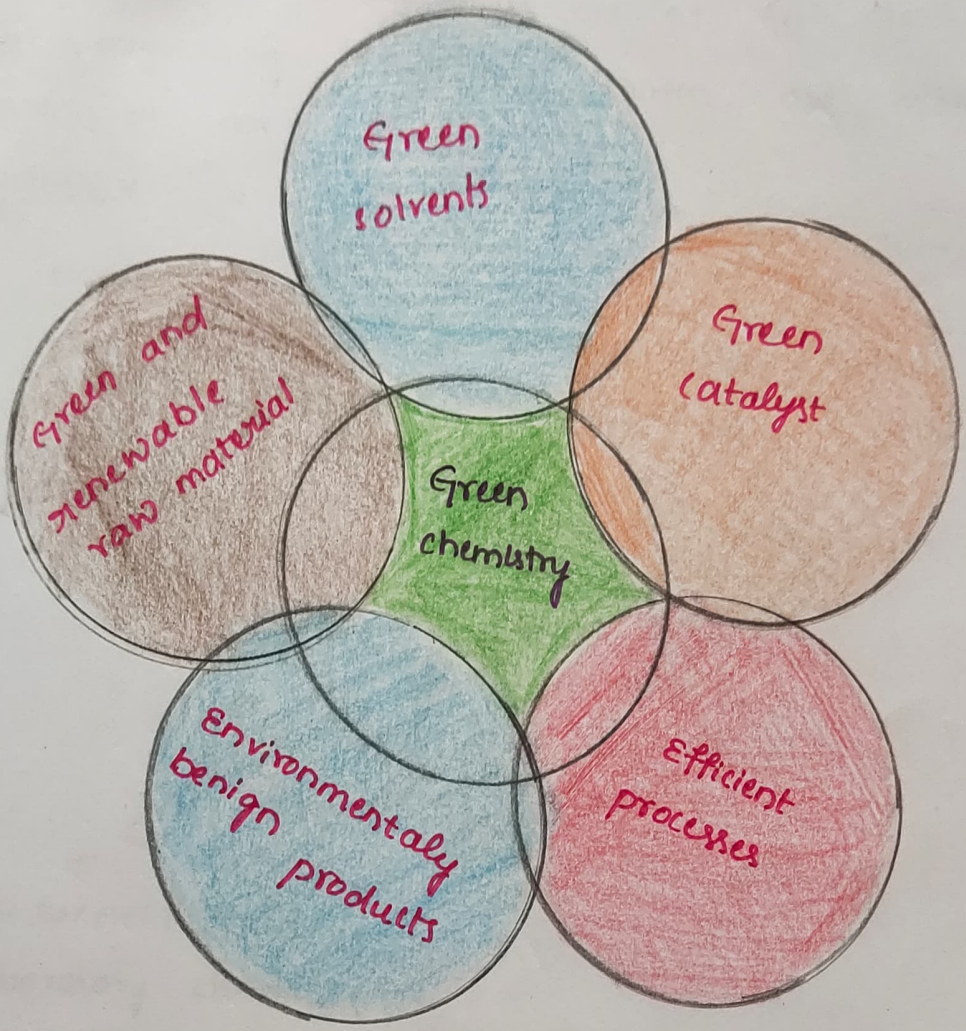
cleaner water : less release of hazardous chemical wastes to water leading to cleaner drinking and recreational water.

increased safety for workers in the chemical industry ; less use of toxic materials ; less personal protective equipment required , less potential for accidents
ex: fires or explosions.

safer consumer product of all types ; safer products will become available for purchase ; some products (ex: drugs) will be made with less waste, some products (i.e. pesticides, cleaning, products will be replacements for less safe products.

safer food : elimination of persistent toxic chemicals that can enter the food chain ; safer pesticides that are toxic only to specific pests and degrade rapidly after use

Less exposure to such toxic chemicals as endocrine disruptors.


Green solvents
Green and renewable raw material
Green catalyst
Green chemistry
Environmentaly benign products
Efficient processes

EXAMPLES OF GREEN CHEMISTRY

1. Green solvents

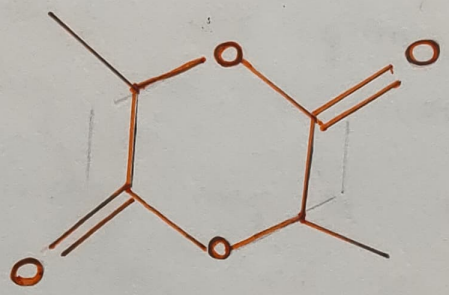
- solvents are consumed in large quantities in many chemical synthese as well as for cleaning and degreasing. Traditional solvents are often toxic or are chlorinated.

2. Hydrazine

$$NaOCl + 2NH_3 \longrightarrow H_2N-NH_2 + NaCl + H_2O$$

$$2NH_3 + H_2O_2 \longrightarrow H_2N-NH_2 + 2H_2O$$

3. Lactide



4. Bio-succinic acid
5. Laboratory chemicals
6. Transesterification of fats
7. carpet tile backings
8. 1,3-propanediol
9. carbon dioxide as blowing agent

CONCLUSION :

Green chemistry

"PREVENTING POLLUTION

SUSTAINING THE EARTH"

- Green chemistry has come a long way since its birth in 1991, growing from a small grassroots idea into a new approach to scientifically - based environmental protection.

- All over the world, governments and industries are working with green chemists to transform the economy into a sustainable enterprise.

Green chemistry may be the next social movement that will set a side all the world's differences and allow for the creation of an environmentally commendable civilization.

Results in source reduction because it prevents and processes on human health and Environment.

"Green chemistry Not a solution to all environmental problems But the most fundamental approach to preventing pollution."

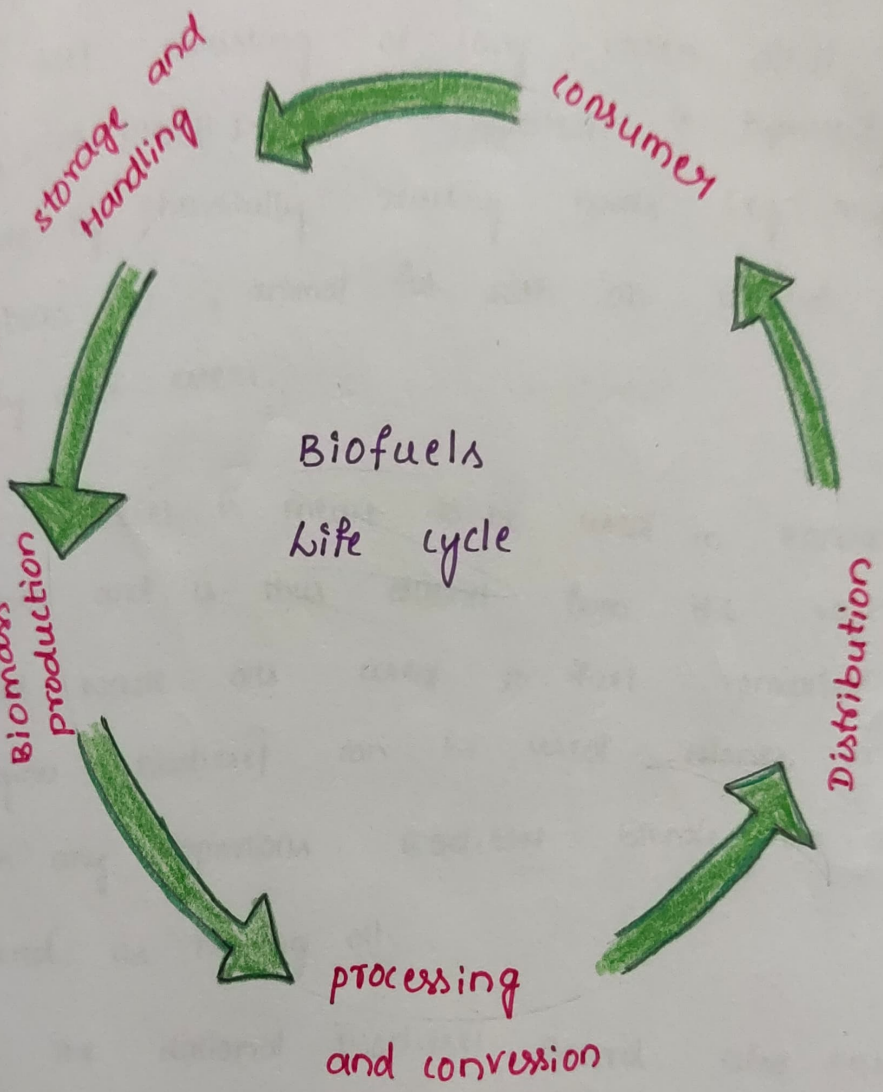
BIOFUEL

A biofuel is a fuel that is produced through contemporary biological processes, such as agriculture and anaerobic digestion, rather than a fuel produced by geological processes such as those involved in the formation of fossil fuels, such as coal and petroleum from prehistoric biological matter. If the source biomater can regrow quickly, the resulting fuel is said to be a form of renewable energy

Biofuels can be derived directly from plants (energy crops) or indirectly from agricultural, commercial, domestic and industrial wastes. It involves generally in carbon fixation. through the process of photosynthesis

Biofuels are in theory carbon-neutral because the carbon dioxide that is absorbed by the plant is equal to the carbon dioxide that is released when the fuel is burned.

Bioethanol is an alcohol made by fermentation, mostly from carbohydrates produced in sugar or starch crops such as corn, sugarcane or sweet sorghum.


storage and Handling
consumer
Biofuels
Life cycle
Biomass production
Distribution
processing
and conversion

BIODIESEL

Biodiesel refers to a vegetable oil- or animal fat based diesel fuel consisting of long-chain alkyl (methyl, ethyl, or propyl) esters. Biodiesel is typically made by chemically reacting lipids (eg: vegetable oil, soybean oil, animal fat with an alcohol producing fatty acid esters.

Biodiesel is meant to be used in standard diesel engines and is thus distinct from the vegetable and waste oils used to fuel converted diesel engines. Biodiesel can be used alone, or blended in any proportions. Biodiesel blends can also be used as heating oil.

The National Biodiesel Board also has a technical definition biodiesel as a mono-alkyl ester.

Applications of Biodiesel:

1. Vehicular use and manufacturer acceptance
2. Railway usage
3. Aircraft use
4. As a heating oil
5. Cleaning oil spills

6. Biodiesel in generators.

Properties of Biodiesels:

1. Fuel efficiency
2. combustion
3. Emissions
4. Material compatibility